

Claims

1. An interaction detecting method for detecting an interaction between materials in a detecting part that includes at least a cantilever at least a part of which is surface treated so as to fix a detecting material thereto, a reaction area for providing a place for an interaction between the detecting material fixed to the surface treated part and a target material, a driving source for vibrating and exciting the cantilever, and a vibration detecting means for detecting the amplitude of vibration of the cantilever, said interaction detecting method comprising:

a detecting step for detecting the interaction by measuring the change of the natural frequency of the cantilever based on the interaction.

2. The interaction detecting method according to claim 1, wherein the cantilever has a vibrator having a piezoelectric material disposed between counter electrodes and the driving source vibrates and excites the cantilever by applying ac voltage between the counter electrodes.

3. The interaction detecting method according to claim 1, wherein the detecting material and the target material are nucleotide chains and the interaction is hybridization.

4. The interaction detecting method according to claim 3, further comprising:

an electric field forming step in which an electric field is formed in the reaction area and while a detecting nucleotide chain and a target nucleotide chain

in the reaction area are stretched, they are relatively moved to carry out the hybridization.

5. A bioassay device having a detecting part that comprises at least a cantilever at least a part of which is surface treated so as to fix a detecting material thereto, a reaction area for providing a place for an interaction between the detecting material fixed to the surface treated part and a target material, a driving source for vibrating and exciting the cantilever, and a vibration detecting means for detecting the amplitude of vibration of the cantilever.

6. The bioassay device according to claim 5, wherein the cantilever has a vibrator having a piezoelectric material disposed between counter electrodes and the driving source vibrates and excites the cantilever by applying ac voltage between the counter electrodes.

7. The bioassay device according to claim 5, wherein the detecting material and the target material are nucleotide chains and the interaction is hybridization.

8. The bioassay device according to claim 7, wherein the detecting part further comprises an electric field forming means for forming an electric field in the reaction area and moving relatively a detecting nucleotide chain and a target nucleotide chain while the detecting nucleotide chain and the target nucleotide chain in the reaction area are stretched to carry out the hybridization.

9. A substrate for bioassay having a detecting part that comprises at least a cantilever at least a part of which is surface treated so as to fix a detecting

material thereto and a reaction area for providing a place for an interaction between the detecting material fixed to the surface treated part and a target material.

10. The substrate for bioassay according to claim 9, wherein the detecting part is a cell detecting part in which the cantilever protrudes from a wall surface and a plurality of cell detecting parts are disposed on the substrate.

11. The substrate for bioassay according to claim 10, wherein the substrate is formed as a disc type substrate and the cell detecting parts are provided in radial directions on the disc type substrate as viewed from above.

12. The substrate for bioassay according to claim 10, wherein different detecting materials are fixed respectively for units of the cell detecting parts or units of the grouped plurality of cell detecting parts.

13. The substrate for bioassay according to claim 9, wherein the substrate is formed as a disc type substrate, the reaction areas are provided in line grooves extended in radial directions, and the cantilevers protrude from one side of the line grooves.

14. The substrate for bioassay according to claim 13, wherein different detecting materials are fixed respectively for units of the line grooves or units of the grouped plurality of line grooves.

15. The substrate for bioassay according to claim 9, wherein the reaction area is filled with a material in which a reversible phase change of gel and sol may be generated between room temperature and suitable temperature to a reaction.

16. The substrate for bioassay according to claim 9, wherein the interaction is detected by measuring the change of the natural frequency of the cantilever based on the interaction.
17. The substrate for bioassay according to claim 9, wherein the detecting material and the target material are nucleotide chains and the interaction is hybridization.
18. The substrate for bioassay according to claim 17, wherein the detecting part further comprises an electric field forming means for forming an electric field in the reaction area and moving relatively a detecting nucleotide chain and a target nucleotide chain while the detecting nucleotide chain and the target nucleotide chain in the reaction area are stretched to carry out the hybridization.